

# Charles B. Shoemaker, PhD

Dr Charles B. Shoemaker, PhD, is a Professor of Infectious Disease and Global Health at the Cumming School of Veterinary Medicine at Tufts University. Dr. Shoemaker currently leads research focused on the development and application of therapeutic biomolecules for treating a wide variety of infectious diseases and biodefense threats. Most of the therapeutic agents under development employ single domain antibody (sdAb) binding agents consisting of the V<sub>H</sub> region of heavy-chain-only Abs (VHHs) from immunized alpacas, selected for their ability to neutralize critical pathogen functions. These simple, stable agents are engineered in a variety of ways, typically as multimers, to produce agents having excellent therapeutic efficacies in animal models. Employing these VHH-based neutralizing agents (VNAs), Dr. Shoemaker has reported successful treatments for a variety of toxin exposures including Botulinum neurotoxins, anthrax and ricin, and toxin-mediated diseases such as from *Clostridium difficile*, pathogenic *E. coli* infections and shigellosis. VHH-based agents are also being developed as toxin and infectious disease diagnostic tools. In addition to NIH support for antitoxin development, the Shoemaker lab is also funded by the Bill and Melinda Gates Foundation to develop VHH-based agents that prevent and/or treat enteric infections by diarrheal disease pathogens.

Prior to arriving at Tufts in 2003, Dr. Shoemaker led the Animal Health Research Unit at the government-owned research company, AgResearch, in New Zealand. This team of over 60 scientists and staff worked to reduce the impact of disease on the animal industry and to leverage this knowledge for human health benefits. Research in the Animal Health Unit primarily centered on internal parasites and bovine tuberculosis. Dr. Shoemaker had joined AgResearch in 1995 from Harvard University, where his research focused on applying biotechnology to reduce the burden of worm parasitic diseases on the developing world, particularly schistosomiasis.

Dr. Shoemaker received his PhD in Biochemistry at the University of Iowa and was a postdoctoral fellow at the Massachusetts Institute of Technology in the laboratory of Nobel Laureate, Dr. David Baltimore. In 1980, Chuck was one of the original scientists at the formation of Genetics Institute, Inc., a highly successful biotechnology company in Boston that was later acquired by Wyeth and is now part of Pfizer. While at Genetics Institute, he was the leader of several drug development projects that resulted in protein pharmaceutical agents now on the market such as two currently used to treat hemophilia. Chuck left Genetics Institute to join the faculty at Harvard in 1987.